

GENUS *NIPPONONEBRIA*
IN THE NEARCTIC REGION, WITH DESCRIPTION
OF A NEW SUBGENUS, *VANCOUVERIA*
(COLEOPTERA: CARABIDAE)¹

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ABSTRACT: Based on a phylogenetic analysis to be presented elsewhere, three Nearctic species, described and formerly placed in the genus *Nebria* are recognized as the monophyletic adelphotaxon (sister group) of the two Palaearctic species in the genus *Nippononebria*. A new subgenus, *Vancouveria* (type species: *Nebria virescens*) is described for the Nearctic species (*Nippononebria virescens*, *N. alisierae*, and *N. campbelli*). The Palaearctic species (*Nippononebria chaldeola* and *N. pusilla*) represent the nominate subgenus.

Nippononebria was first described as a subgenus of *Nebria* Latreille by Uéno (1955:49; see also Uéno, 1952) to include two "remarkably different" Japanese species, *Nebria chaldeola* Bates (1883) and *Nebria pusilla* (Uéno) (1955). In his original description, Uéno cited the apically truncate fourth hind tarsomeres, a scutellar pore puncture on the elytral bases, impunctate metepisterna, and a well developed "sagittal aileron" at the aedeagal base in males as significant distinguishing features of this taxon.

Habu (1958) revised *Nippononebria* and, based on characters of external morphology of adults and larvae, concluded that this taxon should be ranked as a distinct genus. To Uéno's list of distinctive features of adults, Habu added the pubescence on the apical one-third of the third antennomeres. He also suggested that the elongate, projected nasale, reminiscent of that seen in *Leistus* larvae, and the absence of an inner lobe on the maxillary stipes were larval features supporting generic recognition distinct from *Nebria*. In this revision, Habu also described a new species, *Nippononebria kyushuensis* Habu (now considered a subspecies of *N. chaldeola* (Bates); see Nakane, 1963), and a new subspecies, *N. pusilla teres* Habu [later recognized as a junior synonym of *N. pusilla pusilla* (Uéno) (Habu, 1975)]. The only other taxa subsequently included in *Nippononebria* were *N. chaldeola horioi* and *N. pusilla yatsuana*, subspecies described by Nakane (1960).

Prior to my continuing study of Nearctic *Nebria* species and to the present, *Nippononebria* has been considered a strictly eastern Palaearctic taxon, with the geographical distributions of all known species and subspecies restricted to the islands of Honshu and/or Kyushu, Japan. An initial phylogenetic analysis (Kavanaugh, 1978), which included all known Nearctic *Nebria* species, representatives of all described *Nebria* subgenera, and selected Palaearctic

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Nebria species thought to be closely allied to Nearctic forms, suggested that one Nearctic species, *Nebria virescens* Horn, was closely related to the two *Nippononebria* species (*N. chalceola* and *N. pusilla*). Lindroth (1961) placed *Nebria virescens* in its own species group (the *virescens* group), but suggested no particular affinities for this taxon. In 1984, I described two new species, *Nebria altisierrae* and *Nebria campbelli*, which were apparently very closely related to *N. virescens* (Kavanaugh, 1985) and, therefore, could be included in Lindroth's *virescens* group.

Results of a recently completed and more comprehensive cladistic analysis of the Nearctic nebriine fauna (to be published elsewhere) provide evidence that *Nebria virescens*, *N. altisierrae*, and *N. campbelli* form a monophyletic group and, further, that this group is the adelphotaxon (sister group) of a monophyletic group that includes only the two Palearctic species of *Nippononebria*. Consequently, I include in *Nippononebria* both the Palearctic and Nearctic adelphotaxa and rank the putative monophyletic faunal groups as separate subgenera. The purpose of this paper, therefore, is to recognize the congeneric status of Nearctic and Palearctic species groups, provide a revised diagnosis of the genus *Nippononebria* and a key to its subgenera, and briefly describe both the subgenus *Nippononebria*, as the name is here applied, and a new subgenus for the Nearctic species. More extensive descriptions of all taxa, figures illustrating all features discussed, and a comprehensive presentation of the data and results of the cladistic analysis, upon which this paper is based, will be presented elsewhere, in a revision of the Nearctic nebriine fauna (manuscript in preparation).

Genus *Nippononebria* Uéno

Type species: *Nebria pusilla* Uéno (1955:47), by original designation.

Diagnosis. The following features are postulated as synapomorphies in support of the monophyly of this genus and, in combination, also serve to distinguish its members from those of other nebriine genera:

Antennal scape markedly narrowed basally; paraglossae distinct, dentate and minute, not completely fused with glossal sclerite; epilobe of mentum with tooth long; mesosternum, mesepisternum, metasternum (laterally), and metepisternum smooth, impunctate; tarsomeres with dorsal pubescence present but short and very sparse; male median lobe with mid-shaft moderately narrowed basally and slightly compressed in cross-section, apical orifice (in apical aspect) slightly deflected right; female proctiger (mediotergite IX) short, broad, membranous apically, setae of valvifer (laterotergite IX) medium length, gonocoxa (stylomere 1) and gonostylus (stylomere 2) fused medially, widely separated by membranous region laterally, sparsely setose ventrally; diameter of distal portion of spermathecal duct extremely narrow.

Relationships and ranking. Although several synapomorphies for *Nippononebria* are provided above, most of the features noted by Uéno (1955) as distinctive for *Nippononebria* probably represent symplesiomorphies among the Nebriini and other basal carabid tribes. Such features include the apically truncate fourth hind tarsomeres, a scutellar pore puncture on the elytral bases, and a "sagittal aileron" (a thin, vertical, fin-like sclerite in the dorsal midline) at the base of the median lobe in males. The larval features cited by Habu (1958) in support of a generic distinction between *Nebria* and *Nippononebria* also require reinterpretation and additional comment. Larvae of *Nippononebria virescens*, which I have reared from captive adults but not yet described in publication, also have the nasale elongate and projected, and lack the inner lobe of the maxillary stipes, as in *Nippononebria chaldeola* larvae. However, both of these features are shared also with larvae of genus *Leistus* Frölich and, therefore, cannot be viewed as synapomorphies for *Nippononebria* alone. In fact these larval characteristics, as well as several morphological features of adults (manuscript in preparation), support instead the monophyly of a group including only *Leistus* and *Nippononebria* as adelphotaxa. It is this inferred closer phylogenetic relationship of *Nippononebria* with the highly distinctive genus *Leistus* than with *Nebria*, members of which are superficially more similar, that provides the most compelling argument for recognition of *Nippononebria* as a distinct genus.

Distribution. Holarctic (Fig. 2), trans-North Pacific, with species restricted to Honshu and/or Kyushu islands, Japan, in the eastern Palaearctic Region, and to the Pacific coastal area, from southern British Columbia to central California, in the western Nearctic Region.

Subgenus *Nippononebria* Uéno

Type species: *Nebria pusilla* Uéno (1955:47), by original designation.

Diagnosis. The following features are postulated as synapomorphies in support of the monophyly of this subgenus and, in combination, also serve to distinguish its members from those of its adelphotaxon:

Antennomere 3 with moderately dense pubescence on apical one-third; anterior margination of pronotum broad and markedly impressed; elytra moderately convex; male median lobe with preapical shaft faintly deflected right, apex slightly deflected right (in ventral aspect) and bluntly pointed (in lateral aspect); female with basal apodeme of hemisternite VIII emarginate completely to base, bursa copulatrix with spermathecal chamber flat and thin (in lateral aspect), spermathecal duct markedly long.

Although not considered synapomorphies, the following additional features help to distinguish members of subgenus *Nippononebria* from those of subgenus *Vancouveria*:

Elytral microsculpture only faintly impressed; posterior transverse impression of pronotum slightly to markedly deepened and narrow; male with parameres unequal in length, right paramere much longer than left, left paramere broad, short, and narrow basally, right paramere slender and moderately long; female with medial portion of apical margin of hemisternite VIII only moderately setose, valvifer sparsely setose, gonocoxa (stylomere 1) with 3 or 4 medium-length setae in ventral diagonal row, setae in mediodorsal row short or medium length, ventral surface of both gonocoxa and gonostylus (stylomere 2) densely setose medially.

Distribution. The geographical range of this subgenus is restricted to Japan. *Nippononebria pusilla* (Uéno) is represented by two subspecies (*N. pusilla* s. str. and *N. pusilla yatsuana* Nakane), both restricted to central Honshu. *Nippononebria chaleola* is represented by two subspecies on Honshu (*N. chaleola* s. str. and *N. chalceola horioi* Nakane) and a single subspecies on Kyushu (*N. chalceola kyushuensis* Habu).

Subgenus *Vancouveria*, NEW SUBGENUS

Type species: *Nebria virescens* Horn (1870:100), here designated.

Diagnosis. The following features are postulated as synapomorphies in support of the monophyly of this subgenus and, in combination, also serve to distinguish its members from those of its adelphotaxon:

Elytral microsculpture very deeply impressed; posterior transverse impression of pronotum slightly shallow and broad; prosternal intercoxal process with margination only in basal one-half; elytra with apex narrowly oblique, laterally displaced from midline, and posteriorly acute, sutural margin angulate at apex; abdominal sterna III to V each with 2 pairs of posterior paramedial setae; male with parameres approximately equal in length, left paramere broad, medium length, and broad basally, right paramere broad and slightly shortened; female with medial portion of apical margin of hemisternite VIII densely setose, valvifer moderately densely setose, gonocoxa (stylomere 1) with 5 or 6 moderately long setae in ventral diagonal row, setae in mediodorsal row moderately long, and medial surface densely setose, gonostylus (stylomere 2) asetose medially.

Although not considered synapomorphies, the following additional features help to distinguish members of subgenus *Vancouveria* from those of subgenus *Nippononebria*:

Antennomere 3 without or with only extremely sparse pubescence on apical one-third; anterior margination of pronotum moderate in width and depth of impression; elytra only slightly convex; male median lobe with preapical shaft and apex straight and symmetrical (in ventral aspect), apex narrow, sharply pointed (in lateral aspect); female with basal apodeme of hemisternite VIII markedly emarginate, but emargination not extended to base, bursa copulatrix with spermathecal chamber flat and thick (in lateral aspect), spermathecal duct only slightly longer than average for nebrinae.

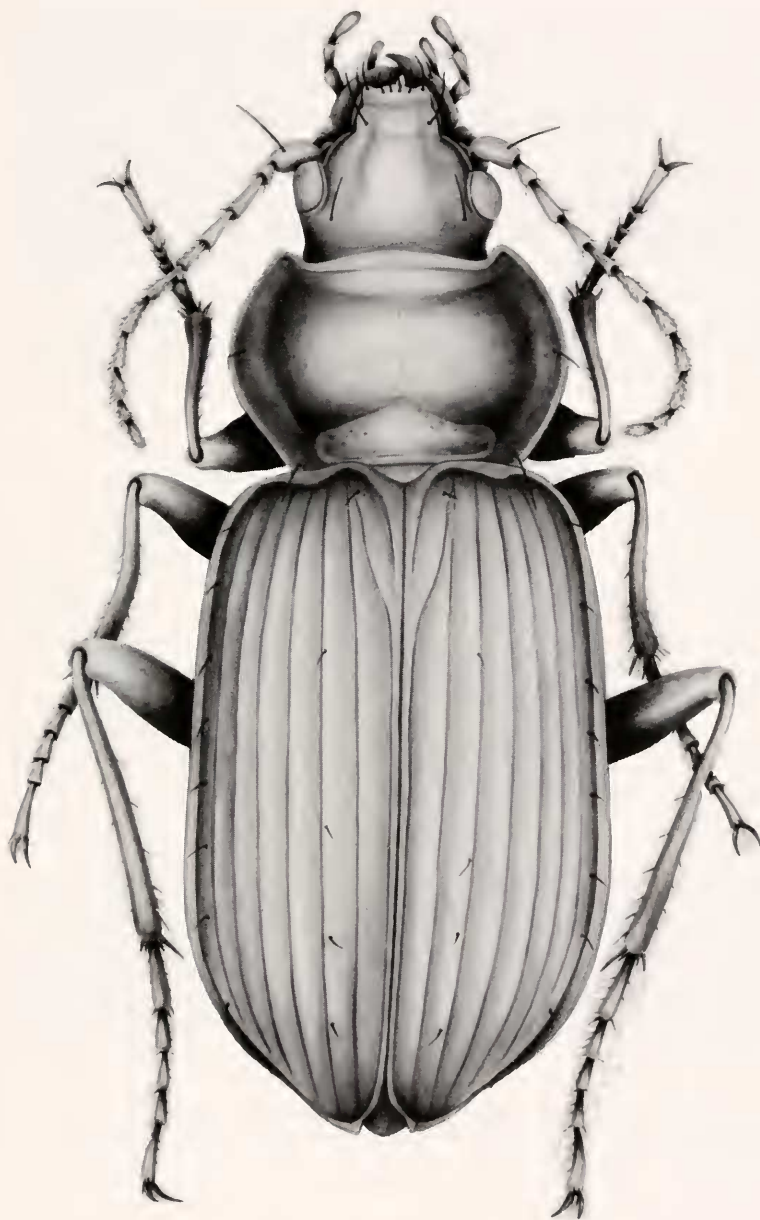


Figure 1. Habitus drawing, *Nippononebria (Vancouveria) virescens* (Horn), adult female from Benton County, Oregon; scale line = 1.0 mm.

Distribution. This subgenus is restricted to a portion of the west coast of North America (Fig. 2) [see also Bousquet and Larochelle, 1993]. *Nippononebria virescens* (Horn) is broadly distributed in coastal regions from southwestern British Columbia to northern California, with an eastern extension of its range into the Columbia River Basin to eastern Washington, northwestern Idaho, and northeastern Oregon. *Nippononebria altisierrae* (Kavanaugh) is restricted to the central Sierra Nevada of California, from Tuolumne County south to Sequoia National Park; and *Nippononebria campbelli* (Kavanaugh) is restricted to high montane areas in southcentral British Columbia and north-central Washington.



Figure 2. Map illustrating geographical distributions of subgenera of *Nippononebria* Uéno; area with horizontal lines = subgenus *Nippononebria*; area in black = subgenus *Vancouveria* Kavanaugh.

As an aid for identification of specimens to subgenus, I provide the following key.

Key to Subgenera of *Nippononebria*

Antennomere 3 with moderately dense pubescence on apical one-third; elytral apex bluntly pointed at midline, sutural margin straight at apex; abdominal sterna III to V each with 1 pair of posterior paramedial setae [specimen from eastern Palaearctic Region (Japan)] subgenus *Nippononebria*

Antennomere 3 without or with extremely sparse pubescence on apical one-third; elytral apex narrowly oblique, laterally displaced from midline, and posteriorly acute, sutural margin angulate at apex; abdominal sterna III to V each with 2 pairs of posterior paramedial setae [specimen from western Nearctic Region (Pacific Coast of North America)] subgenus *Vancouveria*

Checklist of *Nippononebria* Taxa

Genus *Nippononebria* Uéno

Subgenus *Nippononebria* Uéno

Nippononebria (*Nippononebria*) *pusilla* (Uéno)

Nippononebria (*Nippononebria*) *pusilla pusilla* (Uéno)

Nippononebria (*Nippononebria*) *pusilla yatsuana* Nakane

Nippononebria (*Nippononebria*) *chalceola* (Bates)

Nippononebria (*Nippononebria*) *chalceola chalceola* (Bates)

Nippononebria (*Nippononebria*) *chalceola horioi* Nakane

Nippononebria (*Nippononebria*) *chalceola kyushuensis* Habu

Subgenus *Vancouveria*, new subgenus

Nippononebria (*Vancouveria*) *virescens* (Horn), new combination

Nippononebria (*Vancouveria*) *altisierrae* (Kavanaugh), new combination

Nippononebria (*Vancouveria*) *campbelli* (Kavanaugh), new combination

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